Syllabus

Spring 2022 -- COMP 539 -- Software Engineer Methodology

Of 100 Software startups, 90 fail quickly and of the remaining 10, 9 fail slowly -- which is even worse. While nobody knows the exact recipe for success here, we have a pretty good idea of the ingredients that go into such a recipe and one of them is having a highly productive SWE team.

This class recreates a realistic environment of a SWE team working on a high-priority and fast-paced project. Below, we describe the *Objective* (or "What"), *Method* (or "How"), and *Metrics* (aka "Grades") for this class.

What

Q: What will I have learnt?

A: You will have a good understanding of how SWE teams function, challenges they face, and how they succeed, including:

- ***The technological ecosystem:*** the well developed and ever growing toolbox of technologies, many open-source and free -- IDEs, libraries, GitHub, etc. -- which greatly improve productivity.

- ***Best practices:*** design reviews, uniformity of tools and coding style, code reviews, Unit testing, CI/CD, etc.

- ***Communication and teamwork:*** SWE is a team sport and to be successful you need to learn how effective teams self-organize, function as one organism, and resolve contradictions between:

hearing all views		**achieving consensus**
individual initiative	***vs.***	**executing on decisions**
mutual trust and respect		**delivering specific, direct, and timely feedback**

- ***Planning and execution:***
  - Setting clear and granular milestones and establishing deadlines.
  - Readjusting quickly when things change.
  - Making hard choices between ***"features" and quality***, on the one hand, and ***velocity***, on the other.
  - Avoiding "Dark Matter": the progress should be ***incremental*** and ***visible***.
    Projects with no visible progress for a few months will be cut by execs and startups de-funded by VC firms. Therefore, not only should you execute and accomplish -- you must invest in making your progress apparent/visible.

- ***"Building The Castle" mentality***[1]: you should always understand ***why*** you are doing something. Even a small piece -- where is it in the grand scheme of things?

[1] The reference is to a parable: at a large construction site, one asks ordinary workers, "what's your job here?" The first one says, "I am unloading bricks from the truck". The second says, "I am moving bricks from the unloading zone next to the wall". And the third one goes, "I am building The Castle". So...

How

1. The class will be partitioned into small teams of 6-7 people each, and each team will be given the exact same project to work on (TBD on the first day of instruction).

2. The teams are given complete freedom to organize and operate and will enjoy full autonomy.

3. For the ramp-up period of 2-3 weeks, the Instructor/TA will be driving; but they will then fade into a shadow and the class time will be used by individual teams giving updates. The one requirement is that the actual presenters from within the teams rotate, so that each student is given the opportunity to practice his or her presentation skills.

4. At mid-term, and at the end, there will be two "performance evaluations," where each student will write a self-evaluation and solicit/receive peer feedback from all (that gives a better idea of how an individual is performing and also makes it fair for everyone) other students. All these are confidential and will be seen only by the Instructor/TA (and self-evals will be seen by your peers). A summary of the feedback will be released to individual students, without an attribution.

Grading

The actual letter grade will be based on applying a curve to students' "point scores."

Students will earn scores in two ways:

1. **Team Project Progress Presentations (50%)**. Teams will be making multiple presentations about their project, and the instructor and TAs for the class will assign point scores.

   Note that this score applies to the entire team, i.e., each team member will be awarded the exact same score.

   However, in addition to the above team score, ***presenters will be awarded additional points*** based on the quality of their delivery. This "delivery quality" score applies individually.

2. **Performance Evaluation (50%)**. To reiterate, we will have two performance evaluation events: mid-semester and final. We will discuss the process in-class in some detail, but in short: students earn points in two ways:

   a. ***Perf score***, which is assigned based on the self-evaluation and peer feedback.
   b. ***Peer feedback score***, which is assigned based on the quality of the peer feedback, which you gave to other students.

General Information

Class's schedule	MWF 3 PM –3:50 PM, Duncan Hall 1042
Instructor	Dr. Alexei Stolboushkin, aps@rice.edu ***office hours:*** TEMPORARY: By appointment (send email)
TAs	**Sacheth Reddy Mamidi,** sm172@rice.edu TEMPORARY: By appointment (send email) **Abhishek Shah,** ams35@rice.edu TEMPORARY: By appointment (send email) TAs office hours TBD
Overall course objective and expected learning outcomes	See the What section above.
Grade policies	See the Grading section above.
Absence policies	**Liberal.** Yet note that this class is, by nature, very interactive, and a substantial portion of your grade comes from your active participation and pitch during presentations during the class time.
List of required texts	N/A
Special materials required for this class	A personal laptop is required. Having a Macbook (Air or Pro or above) is preferred, but Windows or Chromebook laptops may work. Since the laptops are to be used for development, the cheapest Chromebook models targeted at middle-schoolers might not suffice: you need some RAM and processing power (CPU) to comfortably handle the development tasks.
Required examination and papers	See the How section above.
Statement of expectations regarding coursework	As described above, it is a challenging class, where your success builds on the success of your team and, in addition, requires your active participation during the class time through presentations, discussions, and other interactions, as well as through your self-evaluation and giving and receiving peer feedback. All students commit to the Rice Honor Code.
Special needs	Rice is committed to providing the best educational environment to all of our students and we are particularly cognizant of the students who may have special needs due to a disability. In this class, and in general, we will do our best to provide all reasonable accommodations to students who are disabled or have other special needs. Please contact Alexei to request such specific special accommodations and rest assured that your requests will be handled discreetly and in a timely manner. Rice's Disability Resource Center (DRC) provides more information and resources.

The information contained in this Syllabus is subject to change, based on circumstances and as deemed appropriate, with reasonable advance notice. In particular, the number of expected presentations will depend on the number of students and teams.